

The Red Spot on Jupiter. By James E. Keeler, B.A.

As the letter of Mr. A. Stanley Williams, in the *Monthly Notices* of June 13, has doubtless directed the attention of many observers to the red spot on *Jupiter*, we may expect a large number of sketches and drawings which will aid in the discussion of the interesting question asked. I send a drawing of the planet, with this region near the centre of the disc, which was prepared from sketches, micrometer measures, and observations of transits of prominent markings, made with the 36-inch equatoreal of the Lick Observatory on the night of August 28. It has also been compared with photographs of *Jupiter*, made with the same instrument by Professor Holden.

But few observations of *Jupiter* have been made with the large telescope this summer, and I have not seen the dark spot to which Mr. Williams called attention (unless it should happen to be one of those shown in the drawing); but according to my past experience, all minor markings, on reaching the red spot, are pushed to one side and flow around it. The drawing which I send may be useful for comparison with others, and may possibly aid in identifying the spot in the modified form which it has doubtless assumed by this time. Mr. Barnard, who has observed *Jupiter* much more systematically than myself, thought the spot referred to by Mr. Williams was gradually dissipated on reaching the red spot. It may be that in flowing around the sides of the latter, its colour was so altered by compression into the narrower limits of the belts surrounding the spot, that it could no longer be recognised.

The accompanying drawing was made under favourable circumstances with a power of about 400. Mr. Barnard, who has lately made many micrometer measures and other observations of the principal markings with the 12-inch equatoreal, agrees with me in considering the drawing an accurate representation of the surface features of the planet at the time given, and it may therefore, as far as it goes, be taken to represent the observations of us both.

The aspect of *Jupiter* has undergone considerable changes during the past year. The long streamers of the equatorial zone, which last summer were the most characteristic feature of the appearance of the planet, seem to be disappearing, and only imperfect examples of them remain. The equatorial zone itself has lost much of its intense whiteness. One of the most striking features at present is the series of small dark spots on the north red belt. When first seen by Mr. Barnard last April they were black, or at least very dark and round; now they are a very deep red, and somewhat elongated in the direction of the belts. Two of these spots are shown in the drawing. The great red spot is of about the same dimensions as last year, and has still a dark shade at its following end, but the middle is whiter, and the

arrangement of belts in the vicinity of the spot is somewhat different. Small round white spots are to be seen on the southern hemisphere, but they are smaller and less conspicuous than they were last summer. Other less obvious changes need not be referred to here, as many more observations of *Jupiter* will be possible during the present opposition. It would seem, on the whole, that the surface features of *Jupiter* indicate less activity in the internal forces of the planet than was manifest a year ago.

Lick Observatory,
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Some Experiments relating to the Photometric Comparison of Points of Light with Objects of Sensible Area. By Edmund J. Spitta.

In November 1887 a paper was read before the Society, "On the Appearances presented by the Satellites of Jupiter during Transit," when attention was directed to the fact that whilst using the wedge-photometer during some experiments and measures upon *Jupiter* connected therewith, an unaccountable loss of light was proved to exist when a point of light, such, for instance, as was exhibited by a satellite, was photometrically compared with an object of sensible area like *Jupiter*. For the past three years or more, at the instigation primarily of Professor Pritchard, a protracted research has been in progress to ascertain the cause or causes of such loss, whether physical or physiological; but the subject having extended itself so much further than was anticipated, it has been found necessary to describe the results under three heads: (1) Those connected with the constant of absorption of the wedge-photometer; (2) The objections to employing such a form of photometer when dealing with objects of sensible area and the means devised to remedy the same; and (3) experiments which show peculiar idiosyncrasies in the photoperceptive faculty of the eye when viewing different-sized areas. The object of this communication is to set forth the experiments connected with the last two divisions of the subject.

The results arrived at concerning the first division were presented to the Society in a paper read in March last, but during the progress of the experiments connected therewith, another source of error was thought possibly to cause the loss of light when comparing a point of light with an area in the wedge-photometer. It was this. A point of light, from its very definition, implies that no sensible portion of a wedge is occupied in its passage, but it requires very little thought to perceive that when an area of sensible dimensions is being dealt with this is by no means the case. Moreover, if the area be considerable, the light emanating from its lateral edges impinges on a different thick-